We claim:

1. A supersonic air inlet, wherein substantially all of the air compression takes place within said inlet, incorporating a shock stability bleed system, and comprising external surfaces that are substantially aligned with the airflow approaching the inlet in order to minimally contribute to the sonic boom signature of an aircraft.

2. An inlet according to claim 1 further comprising a stability bleed system that is comprised of bleed regions on the interior surfaces of the inlet exiting into bleed plenums with fixed or variable-exit area control valves, that provides the inlet with the necessary tolerance to changes in engine mass-flow demand or external disturbances (changes in incoming flow angularity or speed), and which prevents inlet unstart under such adverse conditions.

3. An inlet according to claim 2, further comprising variable cowl surface geometry to provide the variation in surface geometry and throat area necessary for optimum inlet performance and meeting the propulsion system's off-design mass-flow demand schedule.

4. An inlet according to claim 3 which is two-dimensional or axisymmetric.

5. An inlet according to claim 4 wherein interior surfaces of said inlet are composed of a series of distinct compression angles, or form a substantially isentropic compression system between said inlet initial angled compression surface and throat of said inlet.

6. An inlet according to claim 5 wherein the downstream exterior inlet surfaces may be maintained as a rectangular cross-section or transitioned to a round nacelle.

7. An inlet according to claim 6 wherein said external surfaces are aligned with the flow of air to the inlet, and interior surfaces at the entrance of the inlet are at an angle of about 2° to 5° to said flow.

8 An inlet according to claim 6 wherein said external surfaces are within about 5° of parallel to the flow of air to the inlet, and interior surfaces at the entrance to the inlet are at angles of about 3° to 10° to said flow.

9. An inlet according to claim 6, wherein external surfaces that are not aligned with the flow consist of a small initial surface angle on the external sidewall and 0° flow aligned internal sidewall surfaces thus eliminating internal sidewall compression and three-dimensional internal flow.

10. A inlet according to claim 1 wherein: substantially all compression shocks are reflected on the internal surfaces; and cowl leading edges are staggered in accordance with off-design Mach number spillage considerations.

11. An inlet according to claim 10 wherein a single bifurcated inlet is derived by joining the exterior surfaces of the longer cowl of two inlets of claim 9 to form a back-to-back arrangement with the duct from the throat of each resulting supersonic diffuser being transitioned to a semicircle at the exit to jointly form a round entrance for a single engine.

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